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the vibration is maintained. It also plays under water!

I have written out the theory, which under a certain assumption, shows that the sound can not be simple harmonic, though periodic. Pursuing the subject farther, I find that the problem leads to an integro-differential equation of a new type, and non-linear. Being in Paris in the summer of 1919 I wrote it out in French, hoping to present it to the Académie des Sciences, but took the précaution to show it to M. Hadamard. When he saw it he threw up his hands and exclaimed, "Vous avez résolu cela?" I replied, "Non, mais je l'ai posé," bearing in mind one of his papers where he had said that a problem was half solved when it was "bien posé." I thought I deserved some credit for that. So there it rests, half (or less) solved. If any of your readers think they can solve it, I am willing to divide the profits, or κῶδος, with them.

I am also indebted to Professor Barus for the word "siffling," which I had thought a Gallicism, but find that it is used by Chaucer.

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VARIATION IN TARAXACUM

TO THE EDITOR OF SCIENCE: Since several species of *Taraxacum* are parthenogenetic and at the same time highly variable they have looked like tempting material for the study of certain phases of genetics. Moreover their "polymorphy," as well as that of other parthenogenetic plants, has served as a partial basis for well-known attempts to explain parthenogenesis as due to hybridization.

As a matter of fact the degree of leaf dissection is correlated with the age of a given rosette. The typical seedling leaf in both of our common species (*T. vulgare*, gray-fruited, and *T. lævigatum*, red-fruited) tends to be entire and smooth, with the plant producing more dissected, and often more hairy, leaves as it grows older. This would have been obvious to students of the genus but for the confusing fact that smooth, entire leaves are often found on very old roots. If such cases are examined, however, it will be found that the apparently

juvenile leaves are borne on multicapital branches of tender age. •

It is of course well known that the vigorous production of blossoms after the second year causes a radial splitting of the root crown in seedling plants and the production of several daughter rosettes upon the parent root. This cleavage may extend through the length of the root and produce a number of distinct individuals, but in any case the daughter rosettes repeat the history of the parent seedling rosette, so far as leaf characteristics and blooming habits are concerned. If the newly split crown has been buried, the daughter rosettes will be produced at the end of typical rhizomes, often as much as six inches in length. Subsequent pressure renders these rhizomes quite root-like.

The above considerations clarify the interesting results of a culture experiment reported by Stork¹. It is, moreover, not unprofitable from the standpoint of taxonomy to inspect the average herbarium collection of *Taraxaca* while bearing in mind the correlations just pointed out.

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SCIENTIFIC BOOKS

Pharmaceutical Botany, A Text-book for Students of Pharmacy and Science. Third Edition. By HEBER W. YOUNGKEN, A.M., M.S., Ph.M., Ph.D., Professor of Botany and Pharmacognosy, Philadelphia College of Pharmacy. P. Blakiston's Son & Co., Philadelphia. 1921. Pp. xix + 479. 238 illustrations and glossary.

This third edition of Dr. Youngken's excellent text-book has all the satisfactory points of the two preceding editions together with an enhanced value to teachers of the subject on account of the extensive improvements made in it. By reason of its adoption as a text in many academic institutions in addition to its very general use in the pharmacy schools, the author has followed the tendency already expressed in the second edition of making it more suitable for general botanical

¹ *Bull. Torr. Bot. Club*, 47: 199-210, 1920.

courses. The book is concise in its presentation of the subject and logical in its arrangement, it supplies exactly the need for a text in a short semester course in botany. It also lends itself well to expansion, as the reviewer has used the earlier editions, by means of supplemental lectures on the evolutionary development of plants, genetics, etc., and laboratory exercises.

This new edition has an increase of ninety pages and forty-three new illustrations have been inserted; adequate illustration is a most important feature in a scientific text-book. Chapter I. has been greatly extended so as to cover the chief methods of microtechnique. This is a practical aid to the student if a laboratory course is given in conjunction with the text-book work. Chapters II. and III. dealing with the alternation of generations and the life histories of the fern and pine, are essentially the same as in the preceding editions except that the illustrations are better, especially the reproductions of the microphotographs of sections. In Chapter IV. the treatment of the angiosperms, with *Erythronium* as a type, is expanded and additional illustrations inserted. Chapter V. entitled Vegetable Cytology is comprehensive to a degree. Mitosis and the morphology of a plant cell are adequately presented as well as a discussion of the modes of reproduction in plants. The section dealing with non-protoplasmic cell contents is especially detailed for such a general text and treats admirably the principal plant products as sugars, starches, glucosides, alkaloids, oils, gums, pigments, etc., with short tests for identifying specific substances as cocaine, veratrine, asparagine, caffeine, salicin, hesperidin, etc., which supplies the needs of pharmacy students in this respect and emphasizes the economic importance of many plants for the general student.

While in its use as a general text it may be rather deficient in the presentation of botanical physiology an attempt is made in this edition to overcome this criticism by a discussion, under the head of Protoplasm and its Properties, of the elements of organic function. Various tropisms are considered

and reference is made to the recent work of Steckbeck on sensitive plants. Chapters VI. and VII. represent the histological and anatomical section of the book. The treatment of plant tissues and organs, as roots, stems, leaves, flowers, is thorough and complete, and while reminiscent of that old and useful general text, Gray's *Lessons in Botany*, is quite modern in its presentation. The concluding Chapters VIII. and IX. cover the subjects of taxonomy and ecology. The latter subject is presented in four pages but the chapter on classification is very complete with regard to plants used in *materia medica*. Only the medicinal plants of each order or family are considered, the official name, the botanical name, the part of the plant used and the habitat being given in each case. The illustrations of these plants are especially helpful. If, however, the book is used as a general text a regular manual or flora could easily be substituted as a reference for that portion of the course in lieu of this pharmaceutical taxonomy.

Although the book was primarily written for pharmacy students, and is used by the reviewer for such students, the broad scope and the diverse phases of botanical science presented in a convenient and orderly manner commend it equally well to teachers as a general text.

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SPECIAL ARTICLES

TWO LIMESTONE FORMATIONS OF THE CRETACEOUS OF TEXAS WHICH TRANSGRESS TIME DIAGONALLY

SOME thirty-five years ago the existence of two great series of Cretaceous formations in the Texas region was pointed out by the writer, and it was shown that each of these—the Gulf and the Comanche Series—represented a cycle of sedimentation which culminated in relatively deeper water formations, known now as the Edwards Limestone and Austin Chalk respectively.

Observations of the past few years during